

CLAIMS:

1. A disk drive, comprising:
disk rotating means which mounts and rotates a disk;
a traverse base which holds said disk rotating means;
a damper member which flexibly holds said traverse base;
a main unit which holds said traverse base through said
damper member;

a tray which mounts a cartridge which houses a disk; and
driving means which loads or ejects said tray and
accordingly moves said disk in said cartridge close to or away
from said disk rotating means,

wherein ~~said~~ cartridge is supported by said main unit
through said tray.

2. The disk drive of claim 1, wherein there is a
traverse base holding member which is moved vertically by said
drive relative to said main unit at the time of tray loading
or tray ejection, and said traverse base is flexibly held by
said traverse base holding member through said damper member.

3. The disk drive of claim 2, wherein said damper
member applies a pre-load in a direction which is parallel to
a surface of said traverse base.

4. The disk drive of claim 1, 2 or 3, wherein the
resonance frequencies of said damper member in the radius
direction of said disk as it is being loaded and in the direction
of a rotation shaft are set higher than the maximum rotational

frequency of said disk.

5. The disk drive of claim 1, comprising:

a positioning member which inserts said tray, as it is loaded into inside said main unit by said driving means, now seating said cartridge into a positioning hole formed in said cartridge, and which accordingly positions said cartridge; and

a cartridge urging member which urges said cartridge against said tray from a direction perpendicular to a disk recording surface of said disk in a condition that said cartridge is positioned by said positioning member.

6. The disk drive of claim 1, comprising:

a positioning member which inserts said tray, as it is loaded into inside said main unit by said driving means, now seating said cartridge into a positioning hole formed in said cartridge, and which accordingly positions said cartridge;

state detecting means which detects a state detecting hole of said cartridge which expresses the states of said cartridge loaded into said main unit and said disk which is inside said cartridge;

a disk clamp member which clamps said disk together with said disk rotating means; and

a cartridge urging member which urges said cartridge against said tray from a direction perpendicular to a disk recording surface of said disk in a condition that said cartridge is positioned by said positioning member.

7. The disk drive of claim 5 or 6, comprising raising/lowering means which moves said disk rotating means, which mounts and rotates a disk, close to said disk,

wherein said cartridge urging member is driven by said raising/lowering means.

8. The disk drive of claim 5, 6 or 7, wherein said cartridge urging member urges said tray in a direction perpendicular to a tray transporting direction, after a naked disk has been loaded into said main unit and when said cartridge is not within said tray.

9. The disk drive of claim 5, 6 or 7, wherein there are at least one pair of cartridge urging members in a symmetrical arrangement with respect to a cartridge transporting direction, and said cartridge urging members urge at about a central position in a cartridge depth direction.

10. The disk drive of claim 1, comprising:

a main unit comprising an opening portion for loading or ejecting a disk or a cartridge housing a disk; a door which is disposed to open and close said opening portion and which is closed with said disk or said cartridge loaded; and

lock means which prevents opening of said door which is closed.

11. The disk drive of claim 10, wherein said main unit comprises a tray which mounts a disk or cartridge and permits loading or ejection through said opening portion, said lock

means engages with said tray, and opening of said door is prevented by means of the loading operation of said tray.

12. The disk drive of claim 10, wherein said main unit comprises a motor and a slide member which moves in accordance with said motor, said lock means engages with said slide member, and opening of said door is prevented by means of operations of said slide member.

13. The disk drive of claim 12, wherein said lock means is integrated with said slide member.

14. The disk drive of claim 1, 5 or 6, comprising:
mount detecting means which detects setting of said cartridge to said tray at a right position with said tray ejected and which outputs a detection signal; and

controlling means which receives said detection signal and outputs an operation instruction to said driving means.

15. The disk drive of claim 14, comprising a detecting member which detects setting of a cartridge to a tray at the right position,

wherein said mount detecting means responds to a detecting operation of said detecting member.

16. The disk drive of claim 15, comprising cartridge holding means which engages with an engagement receiving part of a cartridge in such a manner that said cartridge holding means can be freely detached, positions and fixes a cartridge to a tray,

wherein said cartridge holding means also serves as a detecting member.

17. The disk drive of claim 1, 5 or 6, comprising:
controlling means which controls said driving means based on a predetermined drive profile in which a speed is set differently in accordance with an elapsed time until the completion of traveling of said tray from the start of the traveling of said tray;

detecting means which detects the completion of loading and ejection by said driving means; and

calculating means which measures a loading time and an ejection time of said disk by said driving means based on a result of the detection performed by said detecting means,

wherein said controlling means changes at least one of said speed and said elapsed time contained in said drive profile in accordance with a measured time obtained by said calculating means.

18. The disk drive of claim 17, comprising medium judging means which judges the shape, the size and the like of said disk, wherein said controlling means changes said drive profile by media in accordance with a result of the judgment obtained by said medium judging means.

19. The disk drive of claim 17, comprising measuring means which measures an inside temperature inside said drive, wherein said controlling means changes said drive profile by

predetermined temperature in accordance with a result of the measurement regarding said inside temperature.

20. The disk drive of claim 17, 18 or 19, wherein an operation time of said driving means is changed by said controlling means based on drive processing numbers which are assigned to said drive profile for every inflection point and calculation using a result of the measurement of a loading time and an ejection time calculated by said calculating means.

21. The disk drive of claim 20, wherein selected as an inflection point is a point at which a disk engages with said holding means in said drive profile regarding loading of said disk into said drive.

22. The disk drive of claim 20, wherein selected as an inflection point is a point at which a disk engages with and gets disengaged from said holding means in said drive profile regarding ejection of said disk from said drive.

23. The disk drive of claims 17 through 22, wherein said calculating means sets up a variable as a major drive time in said drive profile, assigns drive processing numbers to said drive profile for every certain period of time, extends an operation time of said driving means when said drive processing number upon detection of an end by said detecting means is larger than an optimal number calculated in advance, but shortens the operation time of said driving means when said drive processing number upon detection of an end by said

detecting means is smaller than said optimal number calculated in advance.

24. The disk drive of claim 23, wherein said calculating means assigns unique values to said drive processing numbers other than said optimal number, and when driving processing ends at said drive processing number, said calculating means adds said unique value unique to said drive processing number to the operation time of said driving means.

25. The disk drive of claim 23, wherein said calculating means multiplies a difference between said drive processing number and said optimal number by a coefficient, and adds to the operation time of said driving means.

26. The disk drive of claim 1, 5 or 6, comprising:
controlling means which controls said driving means based on a predetermined drive profile in which a speed is set differently in accordance with an elapsed time until the completion of traveling of said tray from the start of the traveling of said tray; and

medium judging means which judges the shape, the size and the like of said disk,

wherein said controlling means changes at least one of said speed and said elapsed time contained in said drive profile in accordance with a result of the judgment obtained by said medium judging means.

27. The disk drive of claim 1, 5 or 6, comprising:

controlling means which controls said driving means based on a predetermined drive profile in which a speed is set differently in accordance with an elapsed time until the completion of traveling of said tray from the start of the traveling of said tray; and

measuring means which measures an inside temperature inside said drive,

wherein said controlling means changes at least one of said speed and said elapsed time contained in said drive profile in accordance with a result of the measurement regarding said inside temperature.

28. The disk drive of claim 1, 5 or 6, comprising positioning means which engages with a positioning hole of said cartridge in such a manner that said positioning means can be freely detached,

wherein said positioning means engages with said positioning hole of said cartridge in a condition that said tray has been loaded.

29. The disk drive of claim 1, comprising positioning means which is held by said main unit in such a manner that said positioning means freely engages with and gets detached from a positioning hole of said cartridge,

wherein said positioning means engages with said positioning hole of said cartridge in a condition that said tray has been loaded, and

said main unit holds said damper member and said driving means, and holds said tray in such a manner that said tray is freely loaded and ejected.

30. The disk drive of claim 29, wherein said damper member is disposed to said traverse holder, and said traverse holder is held by said main unit.

31. The disk drive of claim 29, wherein said positioning means can engage with and get detached from two positioning holes, one on the left-hand side and the other on the right-hand side, of said cartridge at one position at least.

32. The disk drive of claim 29 or 30, wherein said positioning means is held in such a manner that the position of said positioning means can be adjusted in the forward/backward direction relative to said main unit.

33. The disk drive of claim 29, comprising a cam member which vertically drives said traverse base and said positioning means,

wherein said traverse base and said positioning means share the same cam mechanism which is disposed to said cam member.

34. The disk drive of claim 28, 29, 30, 31, 32 or 33, comprising a guide member which guides vertical driving of said positioning means, said guide member has a tapering shape which tapers over multiple steps, and a gap between said positioning means and said guide member becomes the smallest during

insertion of said positioning means into said positioning hole of said cartridge.

35. The disk drive of claim 29, wherein said cartridge comprises a state detecting hole which expresses the state of said disk housed in said cartridge, state detecting means is disposed which is held by said main unit in such a manner that said state detecting means can engage with and get detached from said state detecting hole, and said positioning means and said state detecting means ascend in synchronization.

36. The disk drive of claims 28 through 35, comprising second driving means which vertically drives said positioning means.

37. The disk drive of claim 36, wherein said second driving means stops drive force immediately before engagement of said positioning means and said positioning hole of said cartridge completes.

38. The disk drive of claims 28 through 35, comprising traveling restricting means which restricts traveling of said state detecting means after detachment of said state detecting means from said state detecting hole of said cartridge.

39. The disk drive of claims 36 through 38, wherein said second driving means and said traveling restricting means are integrated as one.

40. The disk drive of claims 28 through 39, comprising shutter opening/closing means which opens a shutter of said

cartridge at the time of loading, wherein said tray has a position reference for said cartridge in a direction in which said shutter opening/closing means opens said shutter of said cartridge, and said positioning means is disposed at one position at least.

41. The disk drive of claim 1, 5 or 6, comprising holding means which holds said tray between a loading position and an ejection position in such a manner that said tray can be transported linearly.

42. The disk drive of claim 41, comprising opening/closing means which opens and closes a shutter of said cartridge, wherein said tray comprises cartridge holding means which holds said cartridge.

43. The disk drive of claim 42, wherein said opening/closing means is disposed to said tray.

44. The disk drive of claims 41 through 43, wherein said holding means comprises a shaft disposed in the forward/backward direction to said tray and a shaft bearing disposed to said main unit.

45. The disk drive of claims 41 through 43, wherein said holding means comprises a shaft disposed in the forward/backward direction to said main unit and a shaft bearing disposed to said tray.

46. The disk drive of claim 1, 5 or 6, comprising cartridge holding means which restricts movements of said

cartridge relative to said tray in the loading/ejection direction and which engages with an engagement receiving part disposed to said cartridge in such a manner that said cartridge holding means can be detached from said engagement receiving part.

47. The disk drive of claim 46, wherein no wall surface which is perpendicular to a cartridge seating surface is disposed at the front edge of said tray in the loading/ejection direction.

48. The disk drive of claim 46 or 47, wherein said driving means has a structure that as said tray as it is in the ejected state is pushed manually into inside said main unit, driving for loading is started, and force which engages said cartridge with said cartridge holding means is smaller than force with which said tray is pushed manually into inside said main unit.

49. The disk drive of claim 46 or 47, wherein said cartridge holding means has such a structure which flexibly engages with an engagement receiving part of said cartridge, a stopper is disposed at the rear edge of said tray in the loading direction of said cartridge, and during placing of said cartridge on said tray, a placing limit position for said cartridge restricted by said stopper roughly matches with a position at which said cartridge completes engaging with said cartridge holding means.

50. The disk drive of claim 46 or 47, wherein said cartridge holding means is disposed to said tray in such a manner that said cartridge holding means can sink in an engagement receiving part of said cartridge which has a concave shape.

51. The disk drive of claim 46, 47 or 50, wherein there are engagement receiving parts on the left-hand side and the right-hand side to an axial line of the loading or ejection direction passing through the center of gravity of said cartridge.

52. The disk drive of claim 46, 47 or 50, wherein said engagement receiving part is located on one of the left-hand side and the right-hand side to an axial line of the loading or ejection direction passing through the center of gravity of said tray, or is located on said axial line.

53. The disk drive of claim 46, 47, 50, 51 or 52, wherein said tray comprises a guide member which restricts movements of said cartridge in a direction perpendicular to the loading or ejection direction of said tray.

54. The disk drive of claim 46, 47, 50 or 53, wherein in a condition that an engaging part of said cartridge holding means is about to engage with said cartridge but is not in engagement, in order to prevent loading of said tray into said main unit, an opening portion disposed in a front surface of said main unit for loading and ejection of said tray interferes

with said cartridge holding means.

55. The disk drive of claim 46, 47 or 50, wherein said cartridge holding means comprises, on said tray, a revolution shaft which revolves in a direction perpendicular to the loading and ejection direction of said tray and a holding member which has an engaging part which is axially supported by said revolution shaft and engages with said engagement receiving part, and said engaging part of said cartridge holding means is pre-loaded in a direction of engagement with said engagement receiving part of said cartridge.

56. The disk drive of claim 46, 47 or 50, wherein said cartridge holding means comprises an elastic member which is flexibly deformed in a direction perpendicular to the loading and ejection direction of said tray, and the front edge of said elastic member is deformed through plastic deformation into a projecting shape which sinks into said engagement receiving part of said cartridge which has a concave shape, or an engaging member having said projecting shape is integrated with said elastic member at the front edge of said elastic member.

57. The disk drive of claims 46, 47, 50, wherein in an engaging part of said cartridge holding means which sinks into said engagement receiving part of said cartridge which has a concave shape, a roller having a cylindrical or approximately spherical shape is disposed which rotates along a surface of said cartridge and which comprises a rotation shaft in a

direction perpendicular to the loading and ejection direction of said tray.

58. A loading method for the disk drive of any one of claims 1 through 14 and 19 through 57, comprising:

a first step during which said tray seating said cartridge is loaded into said main unit by said driving means;

a second step during which a positioning member positions said cartridge as it is loaded into said main unit;

a third step during which state detecting means detects the state of said cartridge;

a fourth step during which said disk is held by means of cooperation of disk rotating means and a disk clamp member; and

a fifth step during which said cartridge urging member urges said cartridge against said tray,

wherein after said second step and said third step are executed following said first step, said fourth step and said fifth step are executed.

59. The loading method for the disk drive of claim 58, wherein said disk drive comprises:

mount detecting means which detects that said cartridge is arranged at a right position on said tray with said tray ejected, and which outputs a detection signal; and

controlling means which receives said detection signal and outputs an operation instruction to said driving means.

60. The loading method for the disk drive of claim 59,

wherein said disk drive comprises a detecting member which detects that said cartridge is arranged at a right position on said tray,

wherein said mount detecting means responds to a detecting operation performed by said detecting member.

61. The loading method for the disk drive of claim 60, wherein said disk drive comprises cartridge holding means which engages with said engagement receiving part of said cartridge in such a manner that said cartridge holding means can be freely detached, and which fixes and positions said cartridge to said tray, and

said cartridge holding means also serves as a detecting member.

62. The loading method for the disk drive of claim 58, wherein said disk drive comprises:

controlling means which controls said driving means based on a predetermined drive profile in which a speed is set differently in accordance with an elapsed time until the completion of traveling of said tray from the start of the traveling of said tray;

detecting means which detects the completion of loading and ejection by said driving means; and

calculating means which measures a loading time and an ejection time of said disk by said driving means based on a result of the detection performed by said detecting means, and

said controlling means changes at least one of said speed and said elapsed time contained in said drive profile in accordance with a measured time obtained by said calculating means.